



Risk based decision making



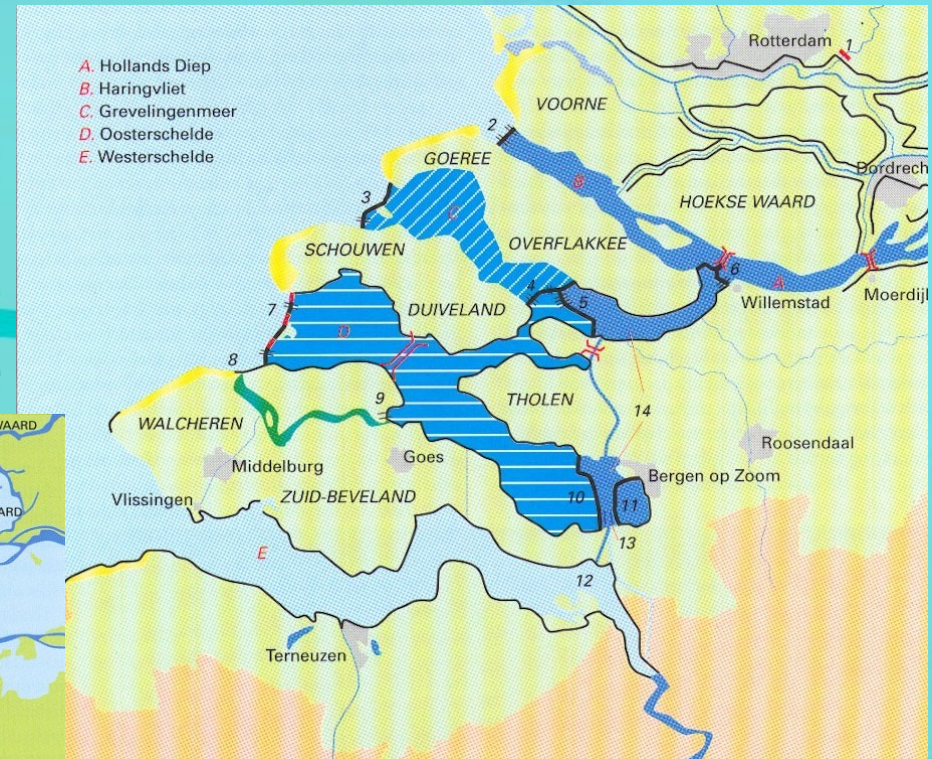
Richard E. Jorissen

Waterinlood 1953 Schouwen-Duiveland, Burghsluis

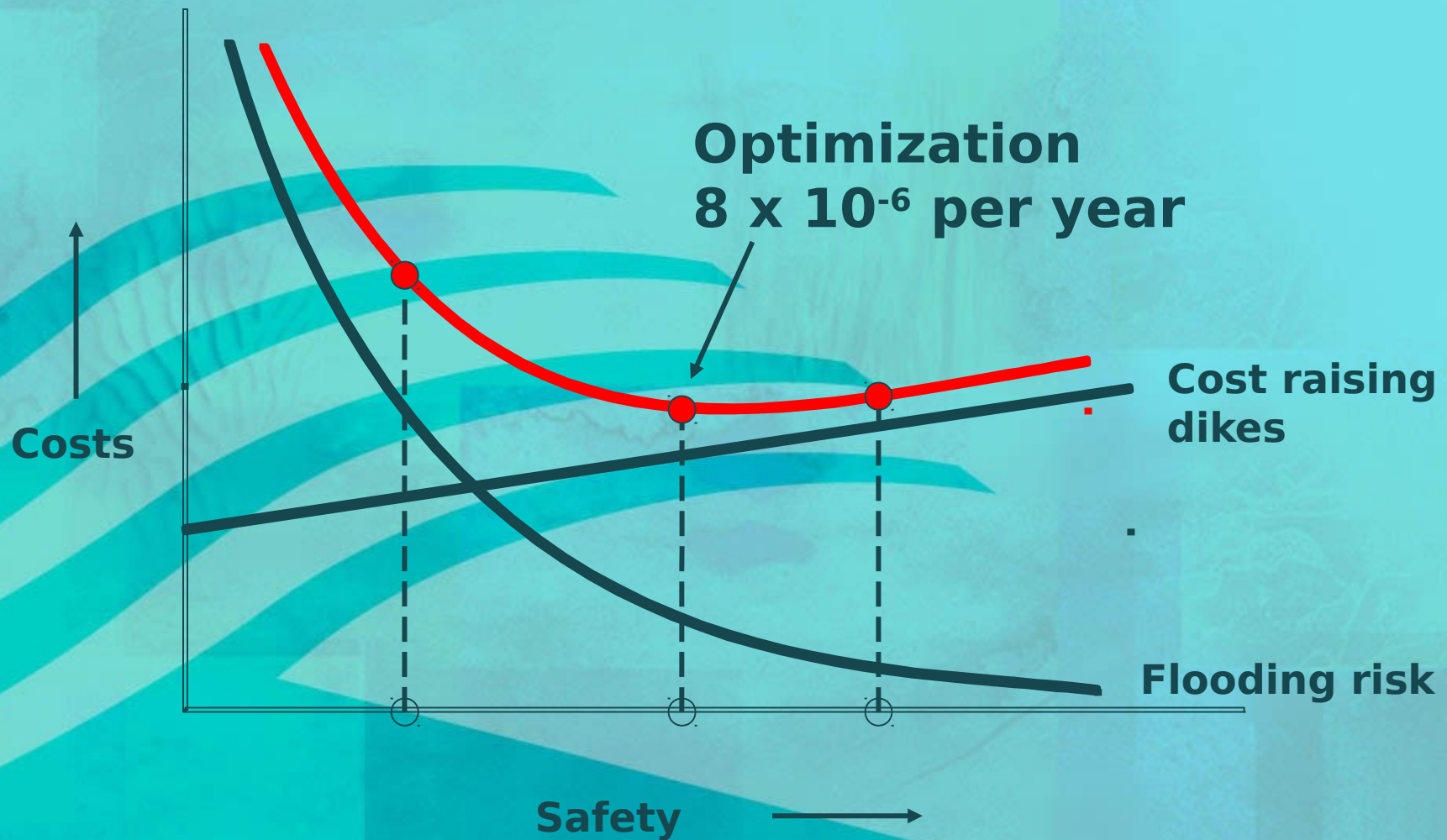
Floods 1953 and the Deltaplan

A new start with:

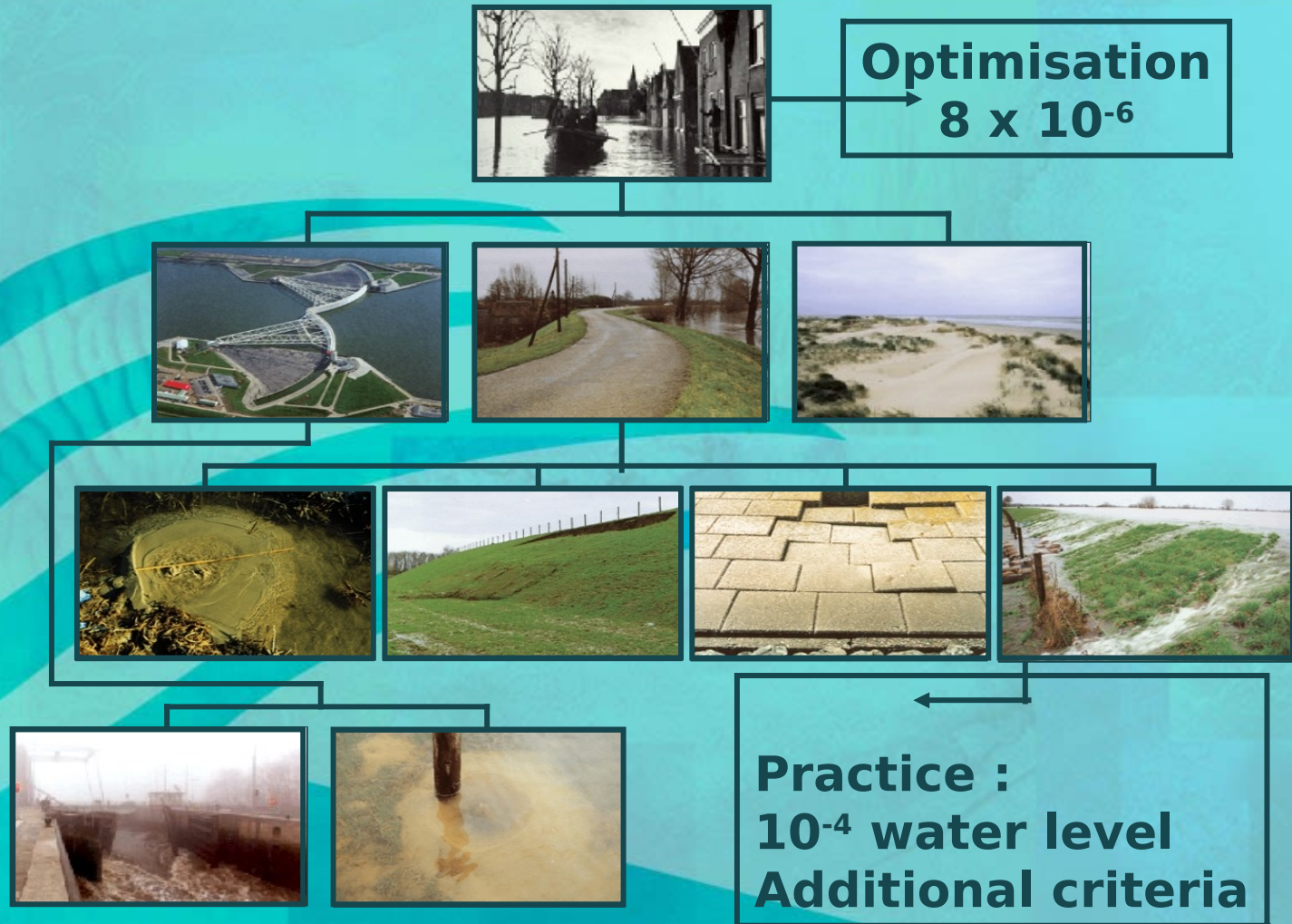
- closing off estuaries
- **safety standards, based on economics**
- national dike improvement scheme



Economic optimization (1956)



Engineering application

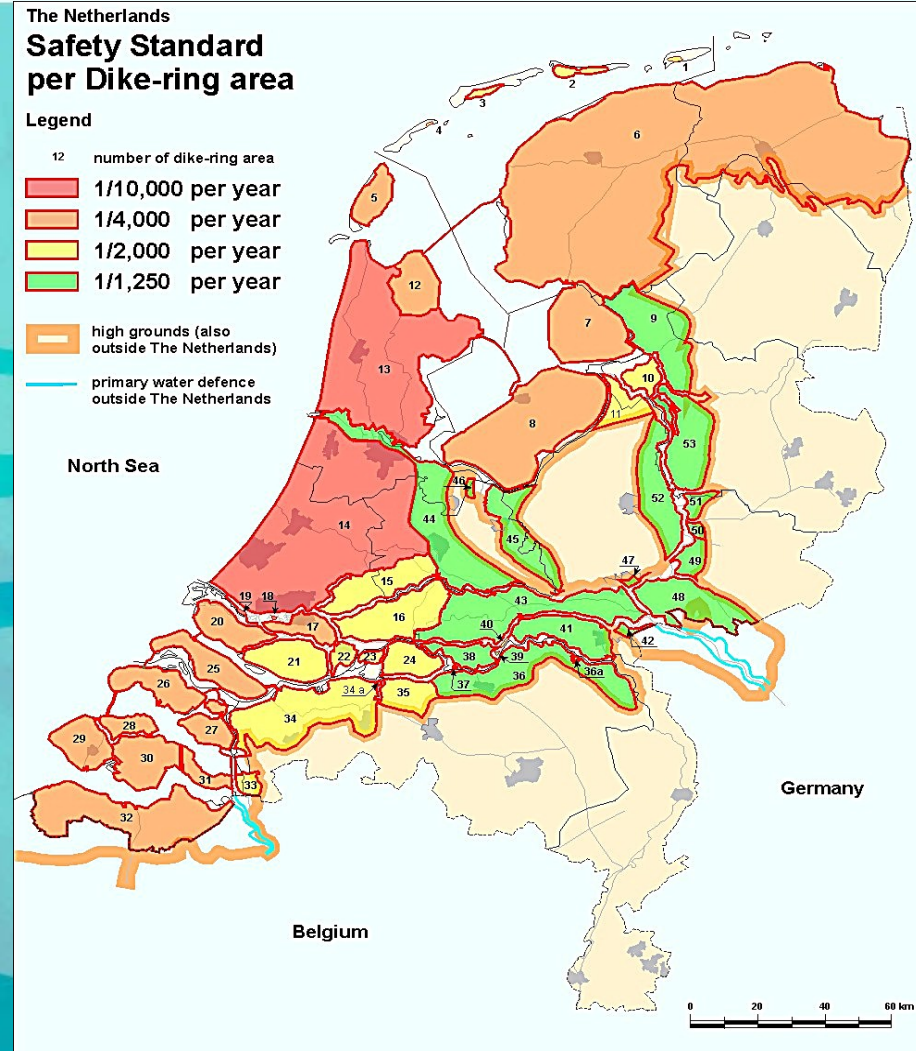


Safety standards

- Decided upon by politics, based on multi-criteria analysis, taking into account:

- Flooding risk
- Construction and maintenance costs
- Environmental impact
- ...
- ...

- Laid down in Flood Protection Act



Application in practice

- **Overtopping:**

- $Pr(\text{overtopping exceeding critical volume}) < \text{safety standard}$



- **Other failure modes**

- $Pr(\text{failure due to other failure modes} \mid \text{no overtopping}) < \text{safety standard} / 10$

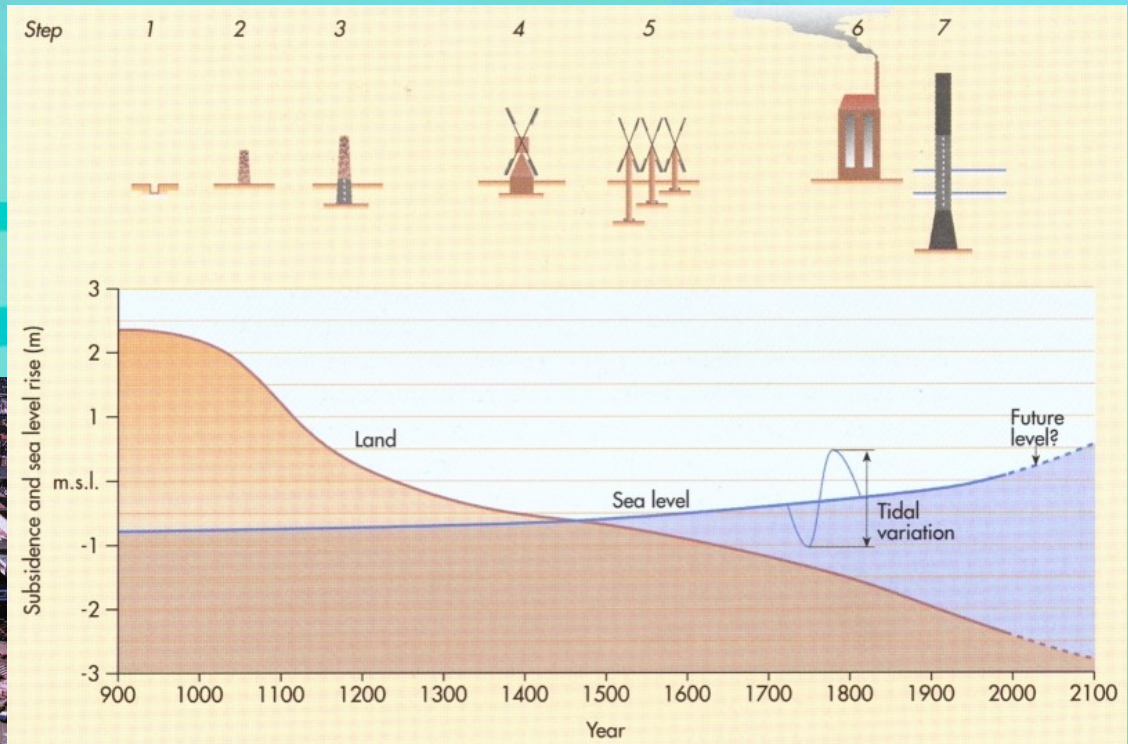
- **Guidelines**

- These two design criteria form up till today the basis for the technical guidelines.
 - The technical guidelines also give the tools how to include technical developments (such as sea level rise, land subsidence)

Future developments

Where do we go from here?

- sea level rise
- drainage, compaction
- societal developments



Future developments

Safety versus risk:

- the lower circle depicts the present policy of maintaining a fixed safety level (including technical developments like sea level rise)
- the upper circle shows the risk-based policy development, which may lead to different standards and/or different measures

